

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 27 JAN 2006

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Applicant's or agent's file reference 904323		<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416
International application No. PCT/JP2004/017830		International filing date (day/month/year) 24.11.2004		Priority date (day/month/year) 13.01.2004
International Patent Classification (IPC) or national classification and IPC H02M7/42				
Applicant TOYOTA JIDOSHA KABUSHIKI KAISHA				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand  27.07.2005		Date of completion of this report  30.01.2006		
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer  Marannino, E.  Telephone No. +31 70 340-3906		



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/JP2004/017830

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-33 as originally filed

**Claims, Numbers**

1-15 as originally filed

**Drawings, Sheets**

1/9-9/9 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing *(specify)*:
- ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing *(specify)*:
- ☐ any table(s) related to sequence listing *(specify)*:

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-15
	No: Claims	
Inventive step (IS)	Yes: Claims	1-15
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-15
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

**Re Item V.**

Reference is made to the following documents:

D1: US-A-5 142 468 (NEREM ET AL) 25 August 1992 (1992-08-25)

D2: US 2002/191423 A1 (ODACHI YASUHARU ET AL) 19 December 2002 (2002-12-19)

The present application relates to an ac voltage generating apparatus that generates AC voltage in car to run electrical devices.

**1 INDEPENDENT CLAIM 1**

**1.1** Document D1 (fig. 1), which is considered to represent the most relevant state of the art to the subject matter of claim 1, discloses an apparatus, comprising:

- first and second three-phase coils (12, 14) (see column 5, lines 18, 19);
- a first current supplying circuit (16) allowing a first AC current having a prescribed frequency to pass through said first three-phase coil;
- a second current supplying circuit (18) allowing a second AC current having said prescribed frequency and a phase being inverted relative to a phase of said first AC current to pass through said second three-phase coil (see phase shifter (28), (in case of maximum power needed -> phase shift =180; claim 1, column 2, line 27-29)); and
- a voltage converter ( $T_A$ ,  $T_B$ ,  $T_C$ ) which outputs an AC voltage having said prescribed frequency.

**1.2** The subject-matter of independent claim 1 differs from the disclosure of D1 in that :

the voltage converter is connected between a first neutral point of said first three-phase coil and a second neutral point of said second three-phase coil.

**1.3** The problem to be solved over prior art D1 can be considered as:

- to reduce number of windings of voltage converter ( $T_A$ ,  $T_B$ ,  $T_C$ )

**1.4** In searching a solution the man skilled in the art would be prompted to use just one winding in order to reduce the number of windings.

Since from D1 there is no mention to the neutral points of the three phase motor (12, 14), neither it is said how the three coils are connected to each other, the man skilled in art would never think to connect the voltage converter between the neutral points.

Instead, in searching a solution for using just one transformer winding, he would take in consideration document D2 (fig. 2) in which a voltage converter (21) is connected between the **neutral point** (N) of a first three-phase coil and the battery(12).

But since in D2 only one inverter is used for generating AC power and no mention is made to another inverter, the teaching of D2 would be not useful to solve the above mentioned problem, while the straightforward combination of the two teaching of D1 and D2 would not lead to subject-matter of claim 1.

**1.5** Therefore the man skilled in the art would not arrive to the subject-matter of claim 1 without using an inventive activity resulting subject-matter of independent claim 1 inventive (Article 33(3) PCT).

## 2 INDEPENDENT CLAIM 8

**2.1** Document D1 (fig. 1 or fig. 5) also discloses: a motive apparatus, comprising a first motor generator (12) including a first three-phase coil as a stator;  
a second motor generator (14) including a second three-phase coil as a stator;  
a first inverter (16) connected to said first three-phase coil;  
a second inverter (18) connected to said second three-phase coil,  
first control means (20, 40, 28,  $CARRIER_1$ ) for controlling said first inverter to allow a first AC current having a prescribed frequency to pass through said first three-phase coil;  
second control means (20, 40, 28,  $CARRIER_2$ ) for controlling said second inverter to allow a second AC current having a phase being inverted (in case of maximum power needed  $\rightarrow$  phase shift = 180°) relative to a phase of said first AC current to pass through said second three-phase coil;  
a voltage converter ( $T_A$ ,  $T_B$ ,  $T_C$ ) which outputs an AC voltage having said prescribed frequency.

**2.2** The subject-matter of independent claim 8 differs from the disclosure of D1 in the same feature as in paragraph 1.2

**2.3** Therefore the same reasoning as in paragraph 1.3-1.4 applies also for independent claim 8, resulting subject-matter of such claim also inventive (Article 33(3) PCT).

### **3 INDUSTRIAL APPLICABILITY**

The present apparatus of claim 1 and apparatus of claim 8 find an application in the field of hybrid vehicle therefore the industrial applicability of such claims 1 is beyond any doubt.

### **4 DEPENDENT CLAIMS 2-7, 9-15**

Since remaining claims are dependent on claim 1 or claim 8, they also meet the requirements of Articles 33(2), 33(3), 33(4) PCT.